UNESCO-IHE
Institute for Water Education

P. van der Zaag

July 2006

Water's vulnerable value in Africa

Value of Water

Research Report Series No. 22

WATER'S VULNERABLE VALUE IN AFRICA

P. VAN DER ZAAG *

JULY 2006

VALUE OF WATER RESEARCH REPORT SERIES NO. 22

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The Value of Water Research Report Series is published by
UNESCO-IHE Institute for Water Education, Delft, the Netherlands
in collaboration with
University of Twente, Enschede, the Netherlands, and
Delft University of Technology, Delft, the Netherlands

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Contents

1. Introduction

If someone were to ask what the value of water is, what kind of answer would that person expect? A definite price with a precise figure? A fairly narrow economistic (McNeil, 1998) treatise on externalities and opportunity costs? An anthropologist's story on the specific cultural value of water in a given society? An environmentalist's judgement of the ecological functions of water? A lawyer's argument in defence of water as a basic human right? An artist's impression of a waterfall with a rainbow?

If I am specifically asked to say something meaningful on the value of water in African communities, it is implied that this value differs from that of other communities. But does it? Perhaps less than one would superficially assume: the value of water in African communities is very similar to that in other communities because no people can survive without it and we are all in need of it (Gaffney, 1997; Savenije and Van der Zaag, 2002).

Yet we all seem to expect that there is indeed a difference in the way societies value things, and in particular such precious and vital natural resources as land and water. In this essay I aim to come closer to answering satisfactorily the question of what the value of water is in Africa by considering a handful of aspects that I think we should take into account.

My argument is that water obtains value in the process of utilising it, whoever we are and wherever we are. Value is an emergent property or an emergent quality that arises in practice, in working with water, knowing it, capturing it, storing it, cleaning it, putting it to use, aligning activities and techniques to it, consuming it, respecting it, returning it to nature or dumping it, polluting it or perhaps even destroying it.

Since communities have different practices with respect to water, they may value it differently. Asking about the value of water is therefore asking about how a society "treats" water. It may be that the manner in which a society treats its water resource is indicative of its level of development, sophistication and, why not, civilisation.

In this article I will review four aspects of water use and explore the effects these have on how the water is valued. These aspects are knowledge, technology, coordination and competition.

2. Knowledge

Water is valued by humans because of the recognition that we depend on it. Not only that: we realise that other resources we depend on, such as food crops and animals, also rely on water. Further, we care for the resource because we realise that the resource has to retain its capacity of renewal. This presupposes an understanding of the water cycle and of the dynamic relationship between abstraction, use and replenishment and knowledge of sustainable levels of utilisation. This may be demonstrated by the experiences of various communities throughout the African continent. Here I present examples from Kenya/Ethiopia and Zimbabwe.

The nomadic Boran of northern Kenya and Ethiopia are deeply aware of their dependence on wells (see Box 2.1). To them water has great symbolic value. Indeed the whole stream of social life is seen to be analogous to the circulation of water through the soil, wells, milk and the bodies of humans. The main sources of water, wells, are associated with particular clans and underground water is metaphorically associated with "underground" kinship connections. In sharing water for livestock, the Boran emphasise solidarity and mutual respect among humans. The Boran are also aware that there are limits to the sustainable use of water. In all, for the Boran water is a key symbol that organises a series of very different discourses - about gender, fertility, territory, kinship and power (Pálsson, 1990: 11-12).

Box 2.1: Boran hydrogeology and water management

The nomadic Boran of northern Kenya and Ethiopia understand how the different wells in this semi-desert area draw from nine "well-complexes" of permanent waters (*tullaa*). A new well within a particular region may only be dug when the owners of the other wells agree that sufficient underground water is available, as they are aware that wells draw from the same aquifer. Although each well is owned by one clan, any other clan may use it. All have to respect an established order of watering the cattle. The watering of cattle may be labour-intensive if the well is deep and water levels low: long chains of men stand at different levels and pass from hand to hand water buckets made of giraffe skin, all the while chanting rhythmically to ensure the smooth flow of water and to minimise the time each herd spends at the well (Dahl & Megerssa, 1990: 24). Digging a new well normally involves a lot of labour, since wells are generally deep. The workers are fed on meat. This is an interesting dynamic to keep stock at sustainable levels: if the animals are too numerous, there is a need to invest in new wells; digging new wells requires many animals to be slaughtered, reducing stocking rates. As one Boran elder formulated it (Dahl & Megerssa, 1990: 31):

> "That's why we say that the multiplying of cattle is not a serious problem. We can use the excess for the discovery of new sources of water and land. The number of cattle can never be greater than what the land can take."

Boran knowledge of water and hydrology appears to be rooted in historical accounts. This is also the case with communities in Zimbabwe. The Shona of Zimbabwe have only one word (*mvura*) that refers to both water and rainfall. They are keenly aware of their dependence on a good and plentiful rainfall season. Box 2.2 sketches a few elements of Shona knowledge and beliefs of water.

Box 2.2: Some elements of Shona knowledge related to water

Shona communities are aware of their dependence on rainfall. Rainfall is believed to be influenced by the ancestors. Vijfhuizen (1999: 34) describes a community where two chiefs are in conflict, Chief A representing the people that first established the community.

> "Chief A is the first to move the clouds and then Chief B follows in moving the clouds, and then the clouds meet. … "

This describes the requirements for rain to fall, in terms of social harmony between two competing chiefs; but also, in some ways in meteorological terms; the quotation perhaps also reflects an understanding of rain-bearing mechanisms. As if to describe climate change, the story continues as follows:

> "But these days Chiefs A and B have separate ideas and there is not a good connection. They should unite as in previous times. Chief B cannot do it alone."

The fact that rainfall, just as land, is linked to the ancestors demonstrates the importance given to rain. The ancestors are considered the owner of a territory and can ensure its fertility (Lan, 1985: 226). In any community the newcomers have to pay respect to the residents; and every year the oldest ancestors have to be consulted and asked to bring rain. The rainmaker, as spirit medium, has to maintain relations with the ancestors. In former times, the rainmakers controlled the natural environment and agriculture. There were areas considered sacred which could not be cultivated. They also decided when to sow and when to harvest (Ranger, 1999; Lan, 1985). But still today, if the rains are bad, it is believed that the ancestors are unhappy about the conduct of the current generation. As one chief stated: "If there is no cooperation, there is no rain" (Vijfhuizen, 1999: 37).

There are still taboos about using cement and concrete in springs and rivers; otherwise, it is believed the water will dry up (see also Chikozho and Latham, 2005). The flowing water is considered a gift. This seems to imply that you should accept it as it is and not try to control it.

Ranger (1999) recounts the emergence of a prophetess in Zimbabwe during the great drought of 1991/1992. She said (quoted in Ranger, 1999: 284-5):

> "The dams are too many and they also use cement to seal the *njuzu's* homes … It had become impossible for Mwali's water spirits, the *njuzu*, to thrive in the streams of Zimbabwe. … This is my job, to teach the people to be humble with each other. … All the elders died – there is no one to teach people. Nobody knows anymore what the causes of all ills in our land are. … The *Njuzu* said: 'Go and teach all people so they will live again according to law and order, so the rains will come again.' … I try my level best to help, so as to prevent drought, but they [the politicians] do not want to listen."

Some aspects of Shona knowledge may seem esoteric. But the basic value is that of living in harmony, both amongst people and between people and nature (Mohamed-Katerere and Van der Zaag, 2003). As Chief Chitanga Chitanga formulated it:

> "Living in harmony is the grain of our life. We live with others, they live with us. If the customs and the laws agree, people live together in harmony. The elders initiated the young in the ways of respecting the land, the soils where the bones of their fathers and mothers rest." (Hove & Trojanow, 1996: 114)

The Boran and the Shona show that both peoples have a profound appreciation of the importance of water for their societies, to the extent that the physical and the social worlds emerge as being mutually constitutive. The realisation of the importance of water not only translates into an attitude of respect for nature, but also, reflexively, nature is presented as a mirror of society. Whereas for the Boran the water metaphor permeates all important societal dimensions, for the Shona rain emerges as a fundamental value or yardstick; rains may fail if society lacks harmony.

3. Technology

The value that is ascribed to water may not only depend on whether or not its inter-dependencies and the water cycle itself are being understood. It may also be influenced by the degree to which communities have developed technologies that enhance the effective use of the water or reduce the risk of water-related disasters such as droughts. There are many examples in Africa of technological innovations that achieve just that (see e.g. Reij (1991) for soil and water conservation technologies). Here I give three examples of farming systems that are based on endogenously developed water management technologies:

- capturing rainfall through terracing the steep hill slopes in Biriwiri, Zimbabwe;
- mangrove rice polders in Basse Casamance in Senegal;
- indigenous irrigation furrows of the Sonjo in Tanzania and the Taita in Kenya.

Box 3.1: Water harvesting on stone-walled terraces in Biriwiri, Zimbabwe

Biriwiri is a small valley in the Eastern Highlands of Zimbabwe, where from time immemorial people have used the waters of the small Biriwiri river for domestic use and for cultivating crops, on ridges along the riverbed or using irrigation furrows. However, most communal farmers do not have access to river water to irrigate their crops, since their plots are located on the steep hills, away from the river. These farmers use rainwater instead to raise their maize, beans, pumpkins and other crops (Van der Zaag, 2003).

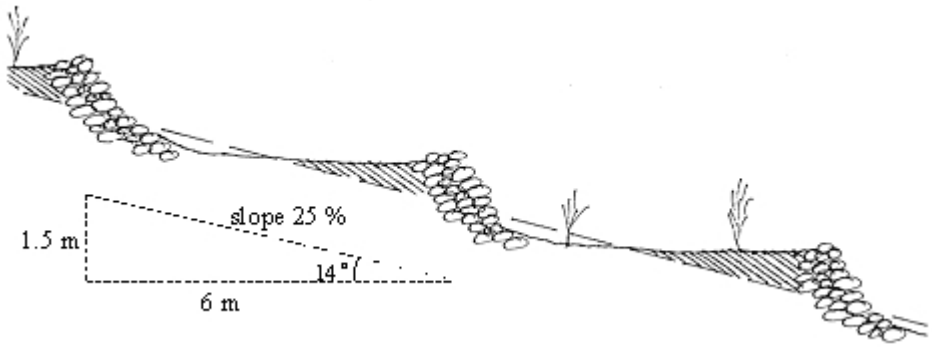

Figure 3.1: The bench terrace (schematic)

What is special about the Biriwiri hill farmers is that they have eked out their arable plots on hill slopes that the agricultural extension service considers too steep and unsuitable for arable agriculture. To cultivate the steep slopes farmers have developed stonewalled terraces (Figure 3.1). The Biriwiri terraces form nearly flat mini-catchment areas where rainwater is captured for the cultivation of crops. The way in which the stone walls are laid out implies that soil erosion is minimised, even on the steepest cultivated hills (steeper than 20%). Farmers manure their fields annually and intercrop maize with beans. Farmers also believe that the terraced fields have an internal source of nutrients that sustain yields: while planting the seed with the hoe, stones that seem to 'grow' to the surface are removed and thrown upon the walls, the soil below being `virgin' and nutrient-rich. Farmers have invested vast amounts of their labour in constructing the terraces (about 300 to 550 labour days per hectare as a once-off investment, excluding the annual maintenance works required).

Box 3.2: Diola rice polders water management technology, Senegal

Rice polders in the Basse Casamance, Senegal, are located in the tidal marshes of the Casamance river and consist of reclaimed mangrove clays (acid sulphate soils). Central to this rice production system of the Diola is the control of salt and fresh water as well as soil acidity and soil salinity by means of dykes and ponds.

A polder starts from the higher sandy soils where the village is located and extends towards the tidal areas where the mangroves have been reclaimed through the construction of dykes (between 0.5 and 2 metres high) with sluices. In between the rice fields and the outer dyke there are water ponds that serve as buffers between the rice fields and the unreclaimed mangrove soils. The ponds are used for fish cultivation and salt production. With these elements Diola farmers manage water flows so that rice can be grown and soil quality is maintained.

In the dry season, when the rice fields lie fallow, farmers consciously keep the water table in the rice fields very high, through maintaining the water level in the surrounding ponds to its maximum. This is not difficult: at high tide salt river water is let in through the sluices. Through the high water table rice soils do not dry up and acidification is forestalled. At the same time, however, the soils become salty.

The first rains are used to wash out the salts from the ridges. The salts are collected in the furrows and this water is drained through the ponds. This is possible because at that time water levels in the ponds are kept low, and excess water is drained at low tide through the sluices in the outer ring-dyke. After this first washing of the rice fields the ridges are ploughed and turned. With the following rains the fields again submerge and then the rice seedlings can be transplanting.

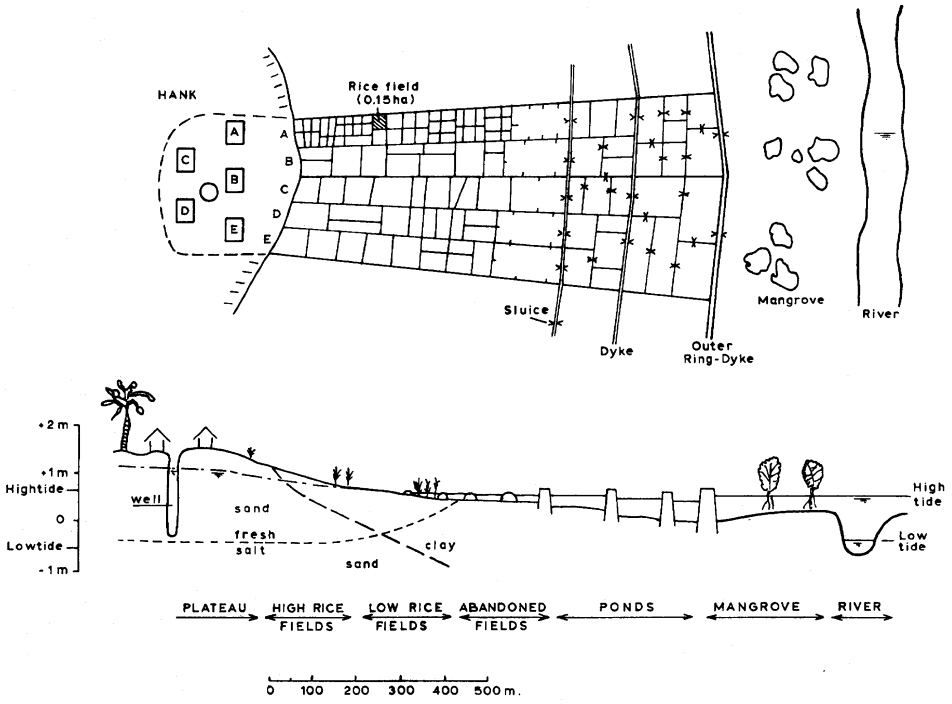

Figure 3.2: Diola rice polders, Basse Casamance, Senegal (schematic)

Now it is crucial to keep the fresh water collected on the rice fields, because with the rains to come the crop has to be raised. The fresh water can be contained through maintaining a high water table in the fields, and this is possible through keeping a high water level in the fish ponds. The result is fresh water standing on the fields, and a shallow fresh water table in the soil, below which the salty ground water is found. In the soil, and in the furrows, then, the fresh water stands ('floats') on the (heavier) salty water. It ensures that no fresh water can seep away (Figure 3.2). Farmers have an intricate knowledge of these phenomena.

Box 3.3: Indigenous irrigation furrows in East Africa

East Africa is famous for its indigenous irrigation development. Here, the Taita in Kenya and Sonjo in Tanzania are briefly described. (The description is based on Fleuret (1985) and Diemer (1988) for the Taita, and Potkanski & Adams (1998) for the Sonjo).

Taita (Kenya)

The Taita live in Coast Province, Kenya, on hills reaching 2,200 meters altitude. Fleuret (1985) describes an irrigation system located along the upper reaches of the Mwatata river. In a stretch of 2.5 kilometres, 16 intake structures built of sticks, rocks and earth feed water into small irrigation canals largely running, some of them for several kilometres, along the contours of the slopes. The canals are 30 to 60 centimetres wide and about 30 centimetres deep. At each field outlets are made by digging away a part of the canal bank. The smallest fields have just one, the largest require more than seven outlets. Within their fields farmers construct temporary ditches to distribute the water evenly. With the succession of generations the layout alters. Men accommodate the needs of their married sons by dividing the plots. Large plots are split from top to bottom, small plots across, by constructing a special ditch at the side of the upper plot to lead water to the lower one. The Taita use their canals and ditches to extend the growing season. When the rains are late, they irrigate and seed. When the rains stop early, the Taita give some supplementary water.

When extending their infrastructure, they meticulously respect the power relationships in which they live, making the lay-out of the canal network reflect their kinship network. Plots are divided as sons become adult and marry or when the father dies. Fathers-in-law may loan plots to their daughters' husbands, and brothers to a sister who is head of a household. The area that a man cultivates thus corresponds more or less with the phase in the domestic cycle. Water is distributed without apparent effort, in an almost incidental way because water relations are governed by, or are even epiphenomena of, social relations. Disputes that may arise between users of different canals when one group's intake structure captures too much water can be solved within the village council of elders. Fleuret (1985: 113) sums up:

> "the canal is not just a water works; it is a physical expression of historical and ongoing social processes."

Sonjo (Tanzania)

Also the Sonjo in Tanzania operate their irrigation furrows according to the local distribution of power. The Sonjo have built their irrigation furrows along the slopes of the Kilimanjaro. Potkanski & Adams (1998) recount that the increasing demand for irrigation water led to scarcity in three villages, especially during the drought of 1992. The hereditary elders enforced their preferential access rights to water and sold water to others. Many ordinary villagers disagreed about this development. In response the District Commissioner organised a public meeting and, while acknowledging the customary rights to water of the ruling hereditary elders, he ordered that the distribution of water be handed to the village council, and the old rotational system of irrigating each area was reintroduced. In face of water shortages, however, the rotations started to lengthen and crops experienced water stress. The incidence of water theft increased. In 1996 uncontrolled stealing of water reached such levels that the lack of power of the village council to control it was publicly recognised. A new agreement was made between the villagers and the ruling elders whereby the role of the latter in water distribution was formalised but kept in check by the village chairman.

What is striking in these three farming systems is that all are based on significant labour investments that are required to build the terraces, the dykes and the furrows. This investment creates and reaffirms the relationship between the investor and his/her investment (see also Von Benda-Beckmann, 1995). Coward (1986a and 1986b) would say that in the process of investment hydraulic property is created, which has to be respected if the farming systems are to remain productive.

But there is more to it. Property relations do not so much define the relationship between a person and an object, they also and specifically define the relationships between humans vis-à-vis that particular object. In the case of the Diola rice polders and the East African irrigation systems it can be seen that ownership of the furrows influences the relationships between the households at village level and also the relationships within the household in terms of gender and age.

In developing technologies and investing in the land, water is better controlled and the landscape is changed. Such investments further enhance the value ascribed to water, at least up to a certain point.

4. Coordination

In utilising the water resource reference is sometimes made to taboos. In many African villages there are taboos related to the use and protection of water from traditional wells and ponds. Although often expressed in mythical language, often these taboos have a very practical effect: they help to ensure that the source of drinking water is kept clean, is maintained and protected and not polluted, and they impress upon all that access to clean water is not self-evident.

We came across the taboo of using cement and concrete in rivers in Zimbabwe (Box 2.2). Cement and concrete is said to harm the water creatures or water spirits. In the Eastern Highlands of Zimbabwe the Manica do not allow concrete to be used in diversion weirs that take out river water for their irrigation furrows. This taboo is interesting from a water management perspective. The diversion weirs in the rivers are simple structures made of local materials. This has two important results: they leak (do not divert all river water) and they collapse (have to be reconstructed each year after the rainy season). Instead of considering this technology as being below-standard, we could consider it as the cutting-edge! The leaking weirs ensure that the rivers do not dry up completely which is good for the environment and for the furrows that take out water further down the river. The fact that the diversion weirs have to be rebuilt annually seems to foster cooperation. The irrigators at the head end of the furrow partly depend on the labour input by the tail-enders during the reconstruction of the diversion weir. The latter's labour investment translates into a claim to the furrow's water that cannot be ignored by the others, ensuring that the water reaches the tail (Van der Zaag, 1999: 171). Manica irrigation technology and water management are internally consistent and mutually reinforce principles of equity and ecological integrity, which are globally recognised dimensions of integrated water resources management (IWRM). Note that the many indigenous irrigation furrows in Tanzania and Kenya are based on a similar dovetailing of technology and management principles (see e.g. Fleuret, 1985; Grove, 1993; Adams et al., 1994; Potkanski & Adams, 1998).

The taboos reviewed here have two effects: first, they explicitly express a norm or value and second, they enforce coordinated or collective action.

With a growing population demand for the goods and services that the water systems produce increases. The specific combination of technological and managerial solutions that characterised these systems may not be adequate anymore. These systems increasingly experience stress. Technological and institutional adaptations have to be made to ensure that the systems cope. Frequently this is impossible and the carrying capacity is exceeded. Power struggles ensue that aim at redefining and reaffirming rights and claims to water. This is exemplified by the struggle over access to irrigation water from the Sonjo furrows (Box 3.3), but there are many more examples (see e.g. Huggins, 2000; Van der Zaag & Röling, 1996). Sadly, sometimes these struggles develop into violent conflict, such as the recent clashes over irrigation water in Kenya whereby 15 people were killed (BBC, 24 January 2005).

5. Competition

In many parts of semi-arid Africa the pressure on the water resource has reached serious levels and tensions between water users are on the increase. The challenge is to find suitable procedures and systems that lead to sharing arrangements that are economically efficient and socially acceptable, while having a limited impact on the environment. The decision-making procedures and systems should build on the management practices that already exist, some of which have been briefly mentioned in this paper. Water sector reforms, legal reviews, formulation of IWRM plans and the establishment of river boards and catchment councils, developments underway in many parts of Africa, pose a unique chance of upscaling local level practices. So far the trend has been to import models from outside. Some of these simply do not work under the given circumstances (see e.g. Van Koppen et al., 2004, for Tanzania, and Derman and Ferguson, 2003, for Zimbabwe).

The clash of values is exemplified by Bev Sithole's detailed ethnography of consultations about the new Zimbabwean Water Act, the new water institutions and the new water permit system (Sithole, 2000). One stakeholder asked rhetorically: "This water that you want permits for, who is making it, who is its owner?" (p.8) – essentially rejecting the notion that we control water that is flowing. In rejecting this, the moderator replied, "water is water, no distinction is made about source, it is use that will determine whether water is paid for." A chief in Nyadire, another sub-catchment area, perceptively pointed to the fact that it is difficult to manage water without the infrastructure to store it. He observed: "We cannot share what is running; how do we plan or manage what is not there?" (Sithole, 2000: 11; Chikozho and Latham, 2005, p. 7-8).

So if indeed the water scarcity problems spread to entire river systems, it may not be enough to adopt foreign management models that are now promoted in Africa. These presuppose a certain degree of control over the water resource that requires certain levels of infrastructure development, i.e. reservoirs. Without this infrastructure, it will be impossible to share the water in a rational, efficient, equitable and peaceful manner.

6. By way of conclusion: water and value under stress

The value of water is in a state of flux in many parts of Africa. This is a reflection of some important developments that directly impact on the water resource. The increased competition over water has in many places led to water obtaining a monetary value and sometimes it is even being traded. This somehow clashes with the perception that water is god-given and that it should be treated with great respect. This is a dilemma that needs to be acknowledged.

On the one hand we have the perception and the profound understanding that water is a gift that we are not supposed to want to control, that water should retain its special and unique status,[1] and that it cannot and should not become private property and monetised. On the other hand there is the urgent need and wish for development and modernisation in Africa, hence the need to exploit the water resource, store it in concrete reservoirs, mobilise it in time and space and turn it into an ally of development.

This dilemma not only reflects the difficult and challenging African reality, it is also a reflection of the profound ambiguity of the concept of value: the moment you have precisely fixed the value, it becomes prone to exchange and alienable (Miller, 1987). Better not to try to define the value of the thing you value most, since it may result in you losing it! This is perhaps what the Dutch poet Lucebert wanted to express when he wrote: *"Alles van waarde is weerloos"* ("Everything of value is vulnerable"). A completely different perspective would be to consider it a gift that must be passed on and shared with others. In sharing it, its value increases (see also Hassan, 2003).

All this is related to the modernisation project in general. Once technological developments have reached the stage that people forget and even deny that they depend on nature and are embedded in it, but start to think that they stand above it, nature being de-mystified, then the perceived value of natural resources gradually erodes. It can now be controlled, exploited and utilised for the benefit of man; in the process man alienates himself from nature. While adding value in a narrow sense, another value is being lost.

But what is the value of water if 42% of the population in Sub-Saharan Africa are still without sustainable access to clean water (UN Millennium Project, 2005)? If Africa is to narrow the development gap with the rest of the world, endogenously developed water management has to be upscaled. Water harvesting technologies and small-scale irrigation technologies should spread widely across the continent. But this may not be sufficient in many densely populated areas. In heavily committed river basins large-scale infrastructure development seems to be a prerequisite for equitable and efficient water management. The water management institutions that are now being designed and established throughout the continent will not be able to control and manage the water resource satisfactorily without this hardware, as the Nyadire chief already observed. This conclusion agrees with the new water resources sector strategy of the World Bank that reinstates its conventional focus on infrastructure development (World Bank, 2004).

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[1] *Compare with Roman Law that classified water in the category of things that belong to each and everyone (*res omnium communes*), i.e. belonging to citizens and non-citizens, animals and plants. See Uys (1996).*

The ultimate challenge, then, is to reconcile the wisdom embedded in African water management as reviewed in this paper, captured by core values of social equity and ecological integrity, with the urgent need for economic development. The new water management institutions as they are currently being developed, for instance in Southern Africa, have the potential to become governance structures that upscale local natural resource management practices. These will have to dovetail with upscaled local and foreign technologies for water control. The perfect fit that is needed is by no means self-evident. It will require African ingenuity to confront and engage modernity while building on the deeply rooted core values.

In all, the answer to the question of what the value of water is in Africa can be a very short one: *x* Pula per litre. If that is the wrong answer, the correct one will be very lengthy, the value of water being a quality that cannot be entirely captured by, and reduced to, a number.[2] It is just like what the author György Konrad observed: "Asked about the meaning of life, people start recounting their entire life history."

[2] *Compare with the critical analysis of the concept of "commensuration" in a water resources context by Espeland and Stevens (1998).*

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